Kinyoun-Francis Disinfecting Machinery

Manufactured by

KENSINGTON ENGINE WORKS, LTD.

FRANCIS BROS.

Beach and Vienna Streets — 704 Arch Street

PHILADELPHIA

UNITED STATES MARINE HOSPITAL SERVICE

DR. WALTER WYMAN

Supervising Surgeon-General

Have the Kinyoun-Francis Disinfecting Machinery in use at many stations.

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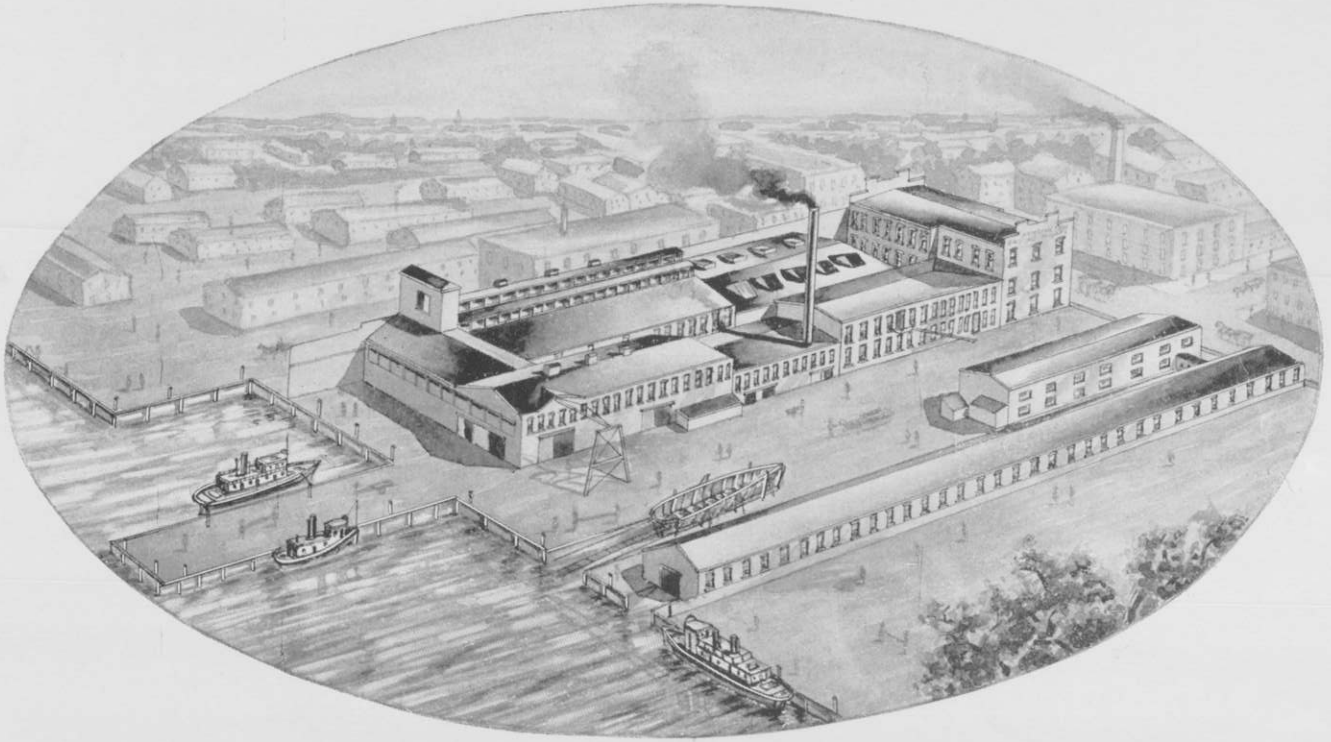


SHOPS OF THE KENSINGTON ENGINE WORKS, LTD., PHILADELPHIA

DISINFECTION

Since the great discovery of Dr. Pasteur and his pupils of the germ theory of disease, perfected by Dr. Koch, much attention has been directed towards the destruction of those bacteria associated with contagious diseases, and more especially since 1883, when Drs. Koch, Gaffky, Loeffler and others, made an exhaustive inquiry into the subject of sterilizing materials by the aid of heat.

Dry heat had its value in killing the bacteria, but it required a long exposure and high temperature, 160° C. (320° F.), to accomplish it, especially if the bacteria were in the spore state.

Moist heat was found to possess bacteriocidal properties to a high degree, either at a temperature of 100° C. (212° F.) to 120° C. (248° F.). It, however, remained for Drs. Esmarch and Dunker to demonstrate that moist heat acts the best, when the steam of low degree and slight pressure was caused to pass over the articles in a slow current.

Several years ago our attention was directed to this subject, and, co-jointly with Dr. J. J. Kinyoun, the able bacteriologist of the U. S. Marine Hospital Service, we have perfected apparati which have proved eminently successful in service and suitable for **ship disinfection at Quarantine Stations, Hospital Service, Portable and Municipal Service.**

QUARANTINE STATIONS

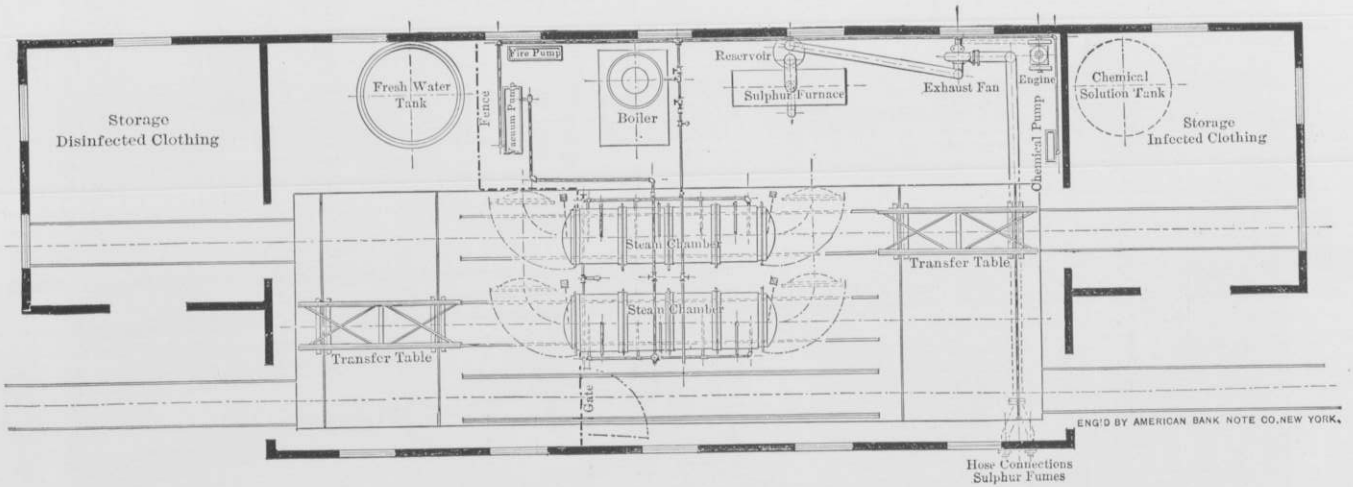
For ship disinfection at Quarantine Stations, the ready means of destroying the bacilli are by *Heat*, by *Fumes* and by *Chemicals*, and in all well-designed modern stations, machinery is provided for the effective use of these means of prevention of spread of contagious disease.

For the heat, a jacketed steam chamber is provided, arranged with vacuum apparatus and retort for generating Formaldehyde gas, cars and transfer tables for the rapid handling of the infected goods.

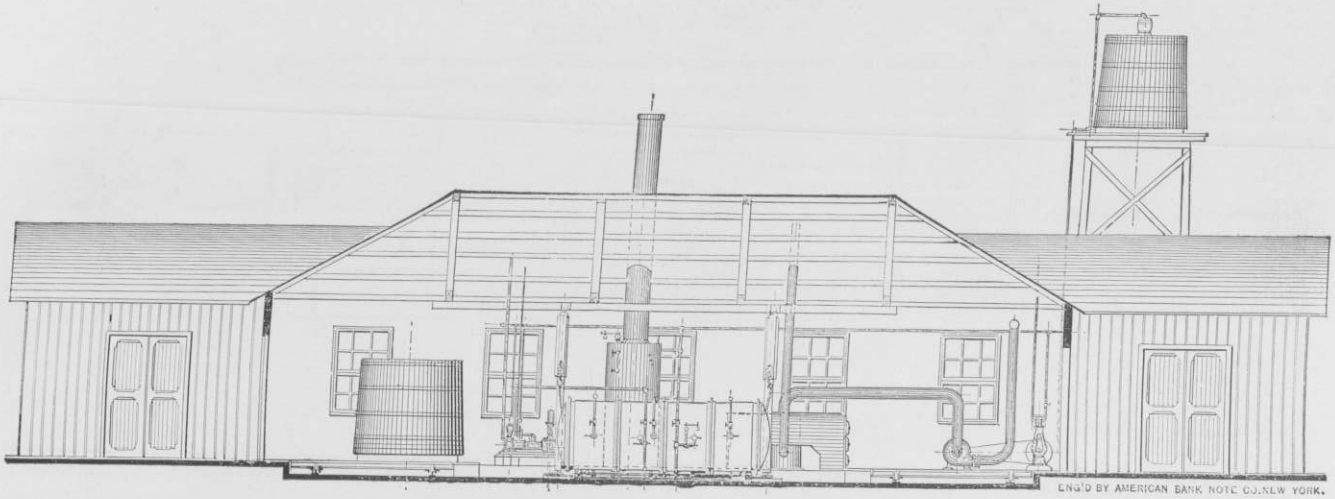
For the fumes, proper furnace for generation of Sulphur Dioxide gas and its distribution to hold of vessel.

For the chemicals, appliances for mixing and distributing the solutions in cabins and berths.

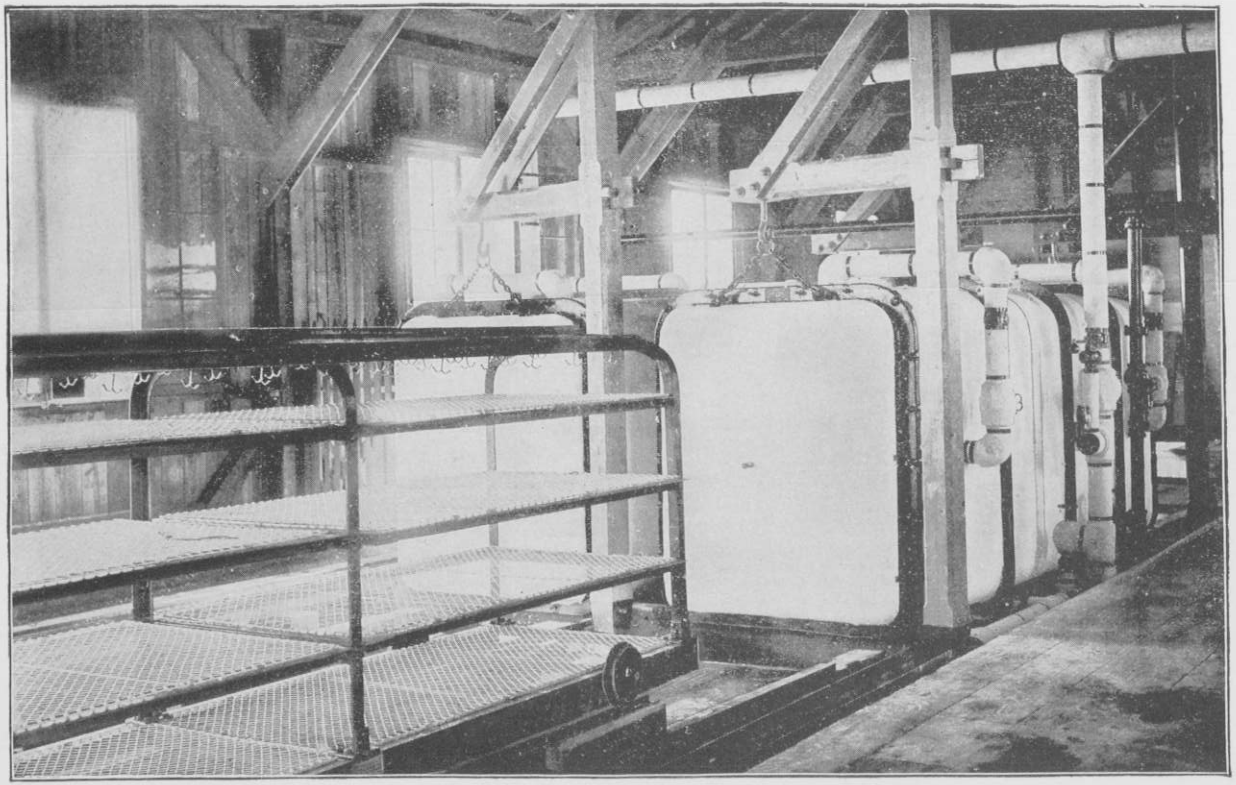
We have had a large experience in this line and are prepared to submit plans and specifications for the construction and equipment of such plants.



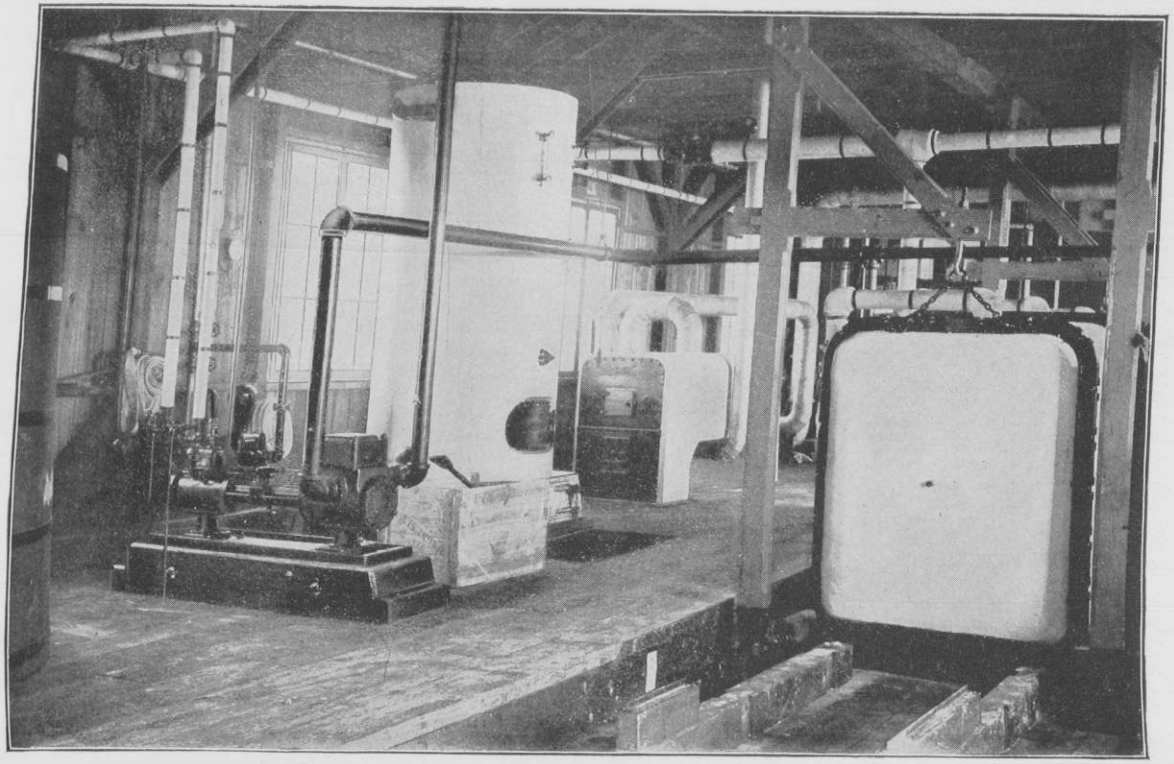
QUARANTINE STATION—PLAN



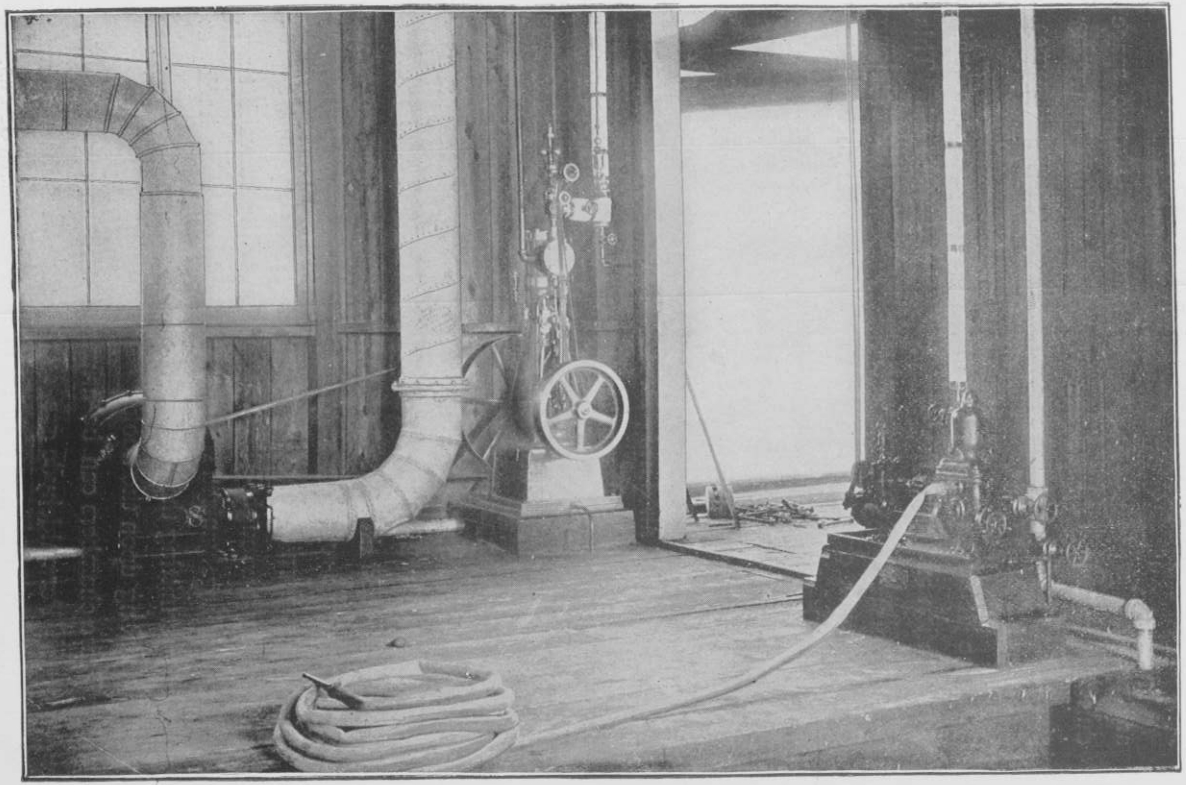
QUARANTINE STATION—ELEVATION



QUARANTINE STATION—VIEW SHOWING CHAMBERS AND CARS



QUARANTINE STATION—VIEW SHOWING BOILER, PUMPS, SULPHUR FURNACE, ETC.



QUARANTINE STATION—VIEW SHOWING ENGINE AND FAN FOR SULPHUR FUMES

THE STEAM CHAMBERS

are rectangular in shape, to give the most effective space during exposure, and are constructed of an inner and outer steel shell, forming steam jacket, with cast-iron end frames, intermediate truss bands and screw stay construction.

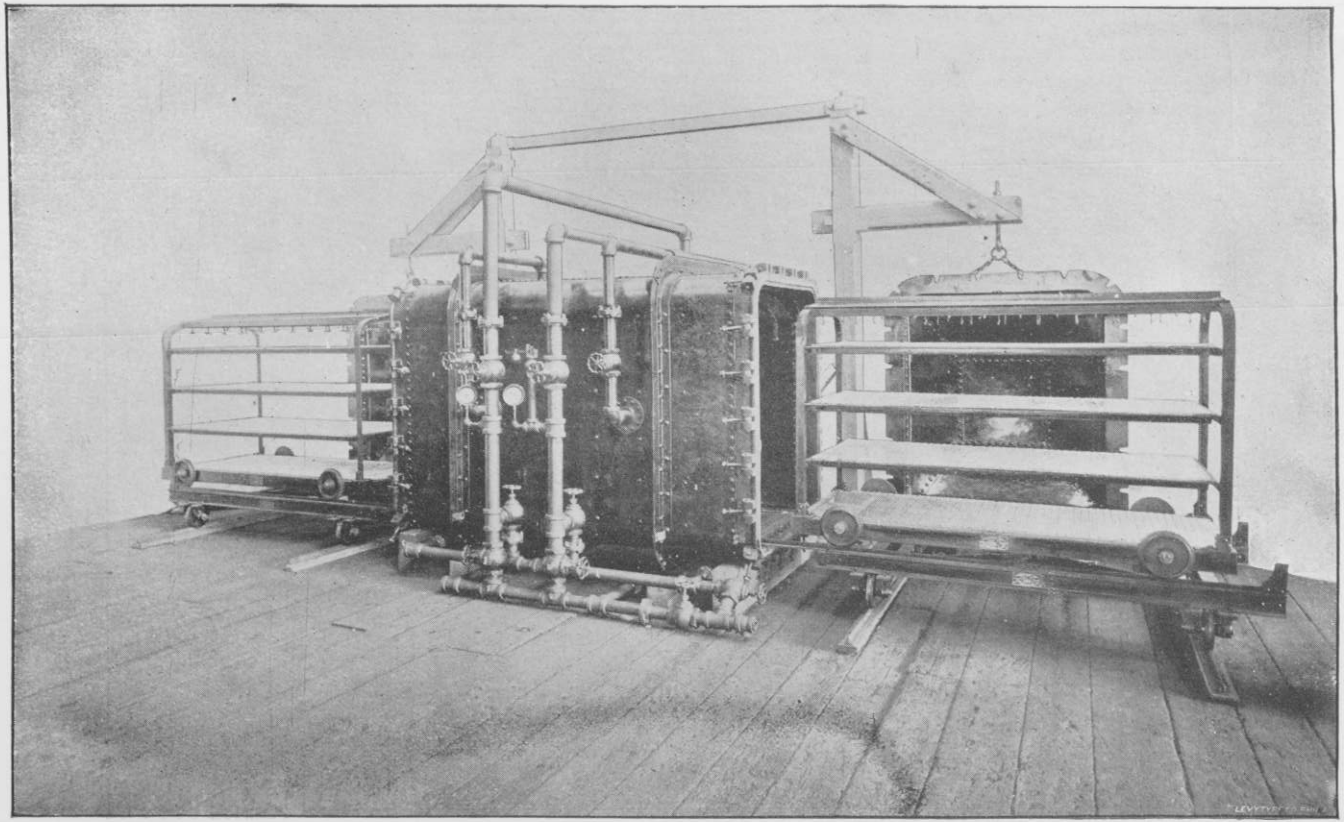
The jacket gives perfect circulation, prevents too rapid condensation and dries thoroughly the goods exposed. This jacket is filled with steam during the entire operation, making the chamber a drying oven, so that the articles to be disinfected are brought to temperature before the admission of steam to the inner chamber and thoroughly dried after the steam has been exhausted.

To prevent a possibility of life to the germ by an admixture of steam and air during exposure, a patent air exhauster is applied, whereby a vacuum of 15 to 20 inches is produced, previous to the admission of steam to the inner chamber.

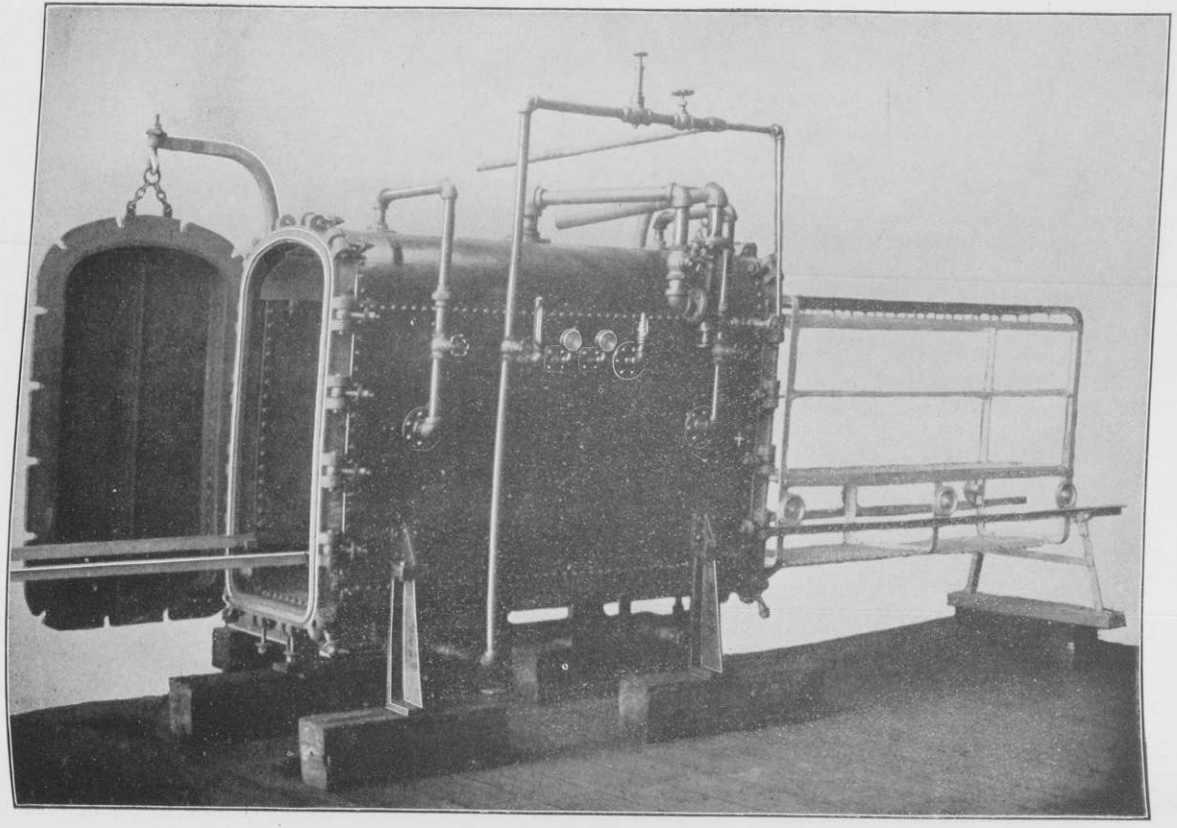
The chamber is also provided with a copper hood, to prevent steam impinging directly upon the clothing; thermometers, to register the temperature; gauges, to indicate both vacuum and steam pressure, and safety-valve, to prevent over-pressure in the chamber, the amount of pressure being regulated by a reducing valve in steam pipe from the boiler.

For convenience of handling the goods, cars are provided, of light wrought-iron construction, with removable trays, covered with galvanized screens, and having bronze hooks at the top, permitting the articles to be laid out upon the trays, or to be hung upon the hooks.

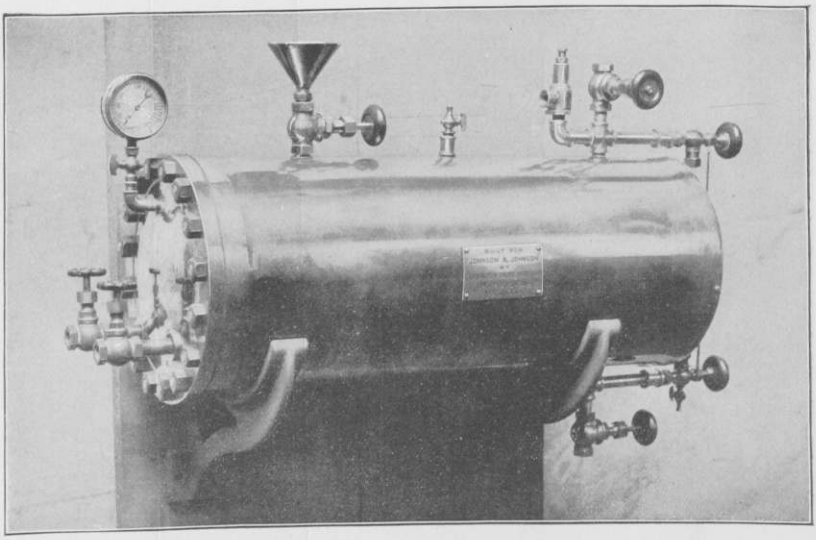
These chambers can be arranged with an apparatus for generating Formaldehyde gas, so that the same chamber may be used for disinfecting by steam or by Formaldehyde gas.

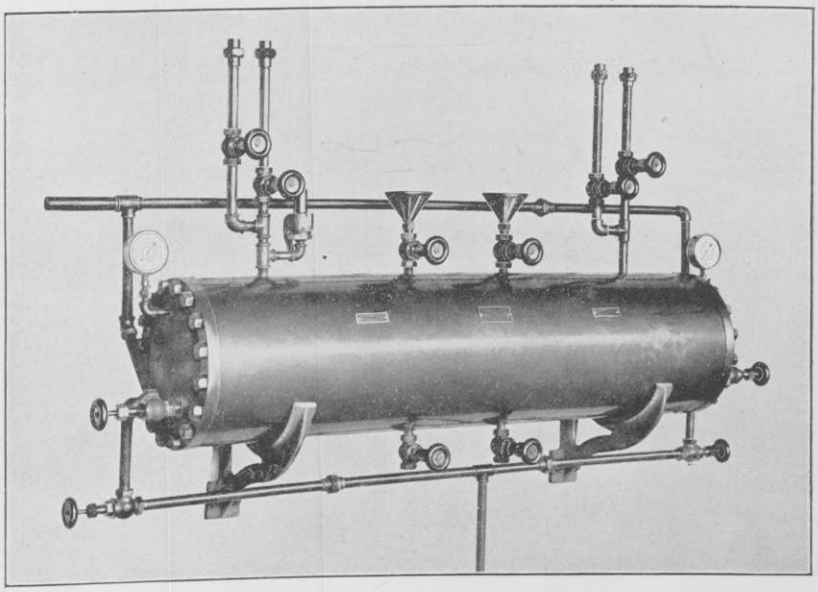


KINYOUN-FRANCIS STEAM DISINFECTING CHAMBER

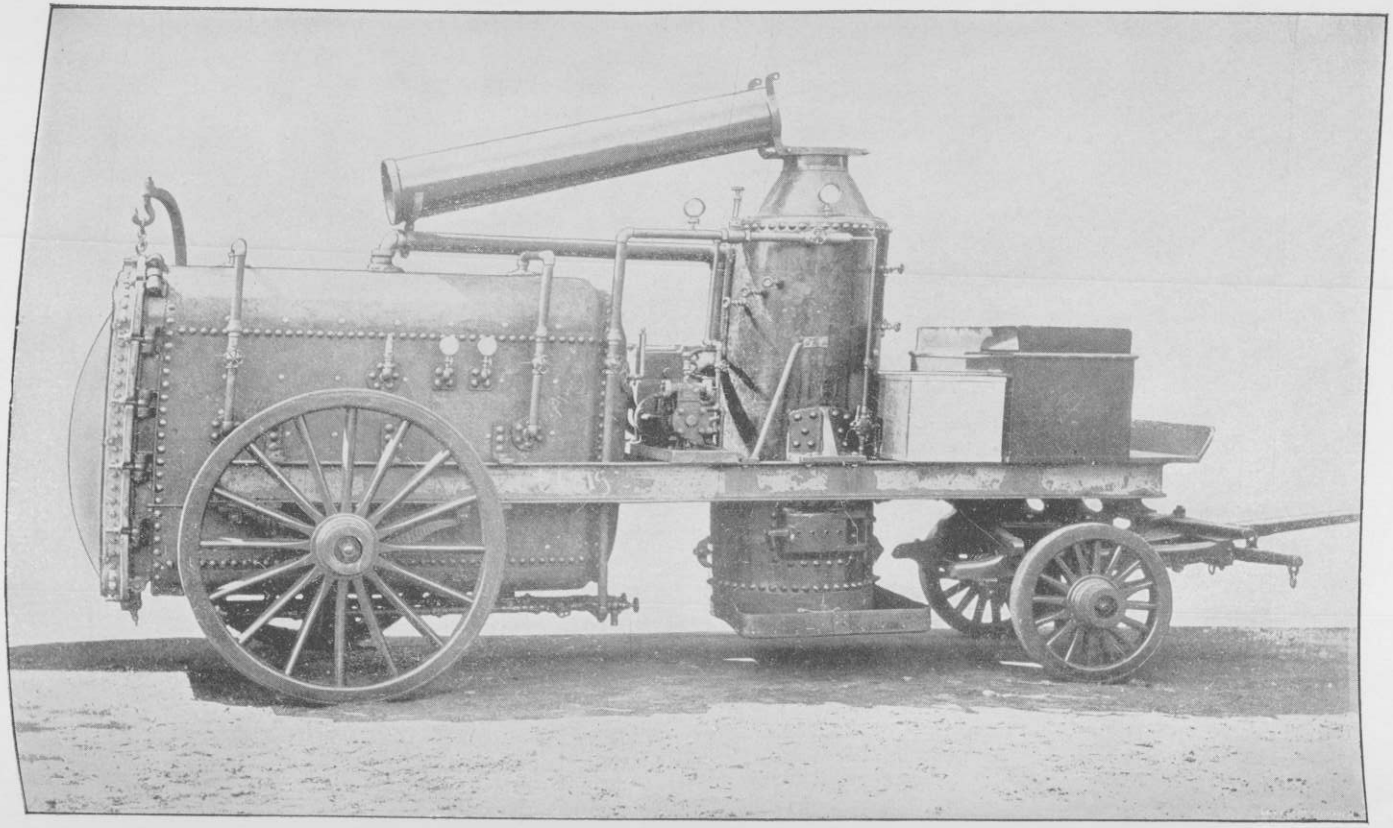


KINYOUN-FRANCIS STEAM DISINFECTING CHAMBER

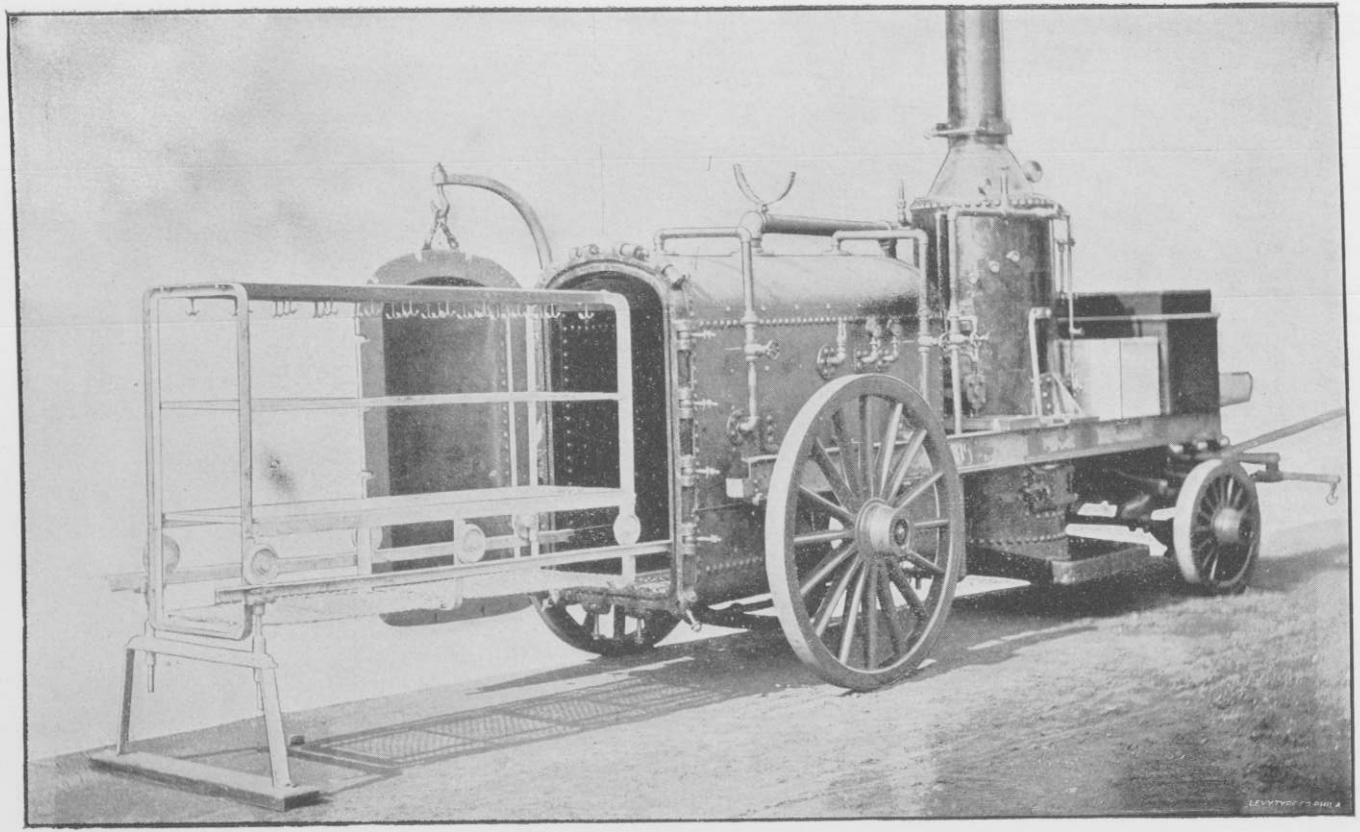




APPARATUS FOR FORMALDEHYDE GAS—FOR ATTACHMENT TO STEAM CHAMBERS



KINYOUN-FRANCIS PORTABLE STEAM DISINFECTOR—CLOSED FOR REMOVAL



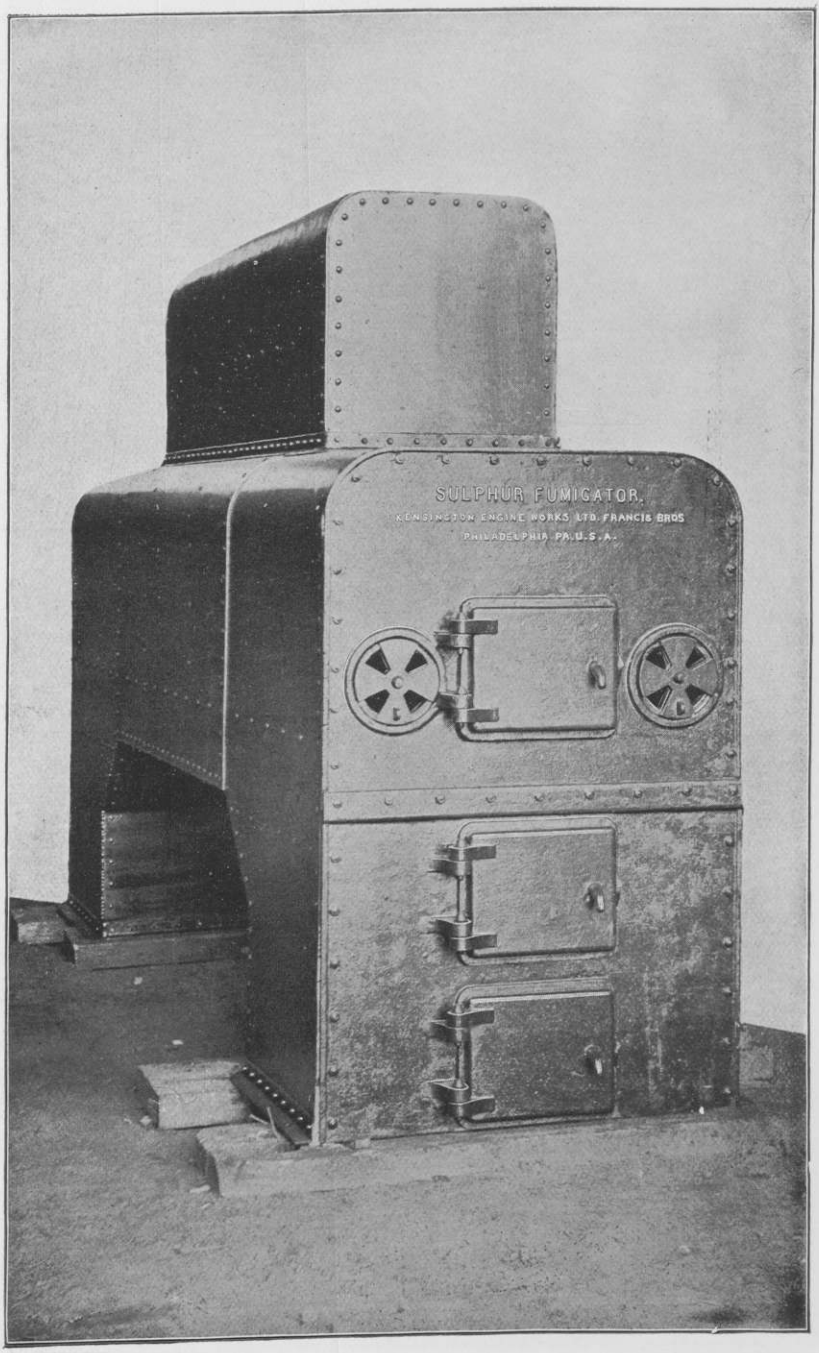
KINYOUN-FRANCIS PORTABLE STEAM DISINFECTOR—READY FOR SERVICE

SULPHUR FURNACES

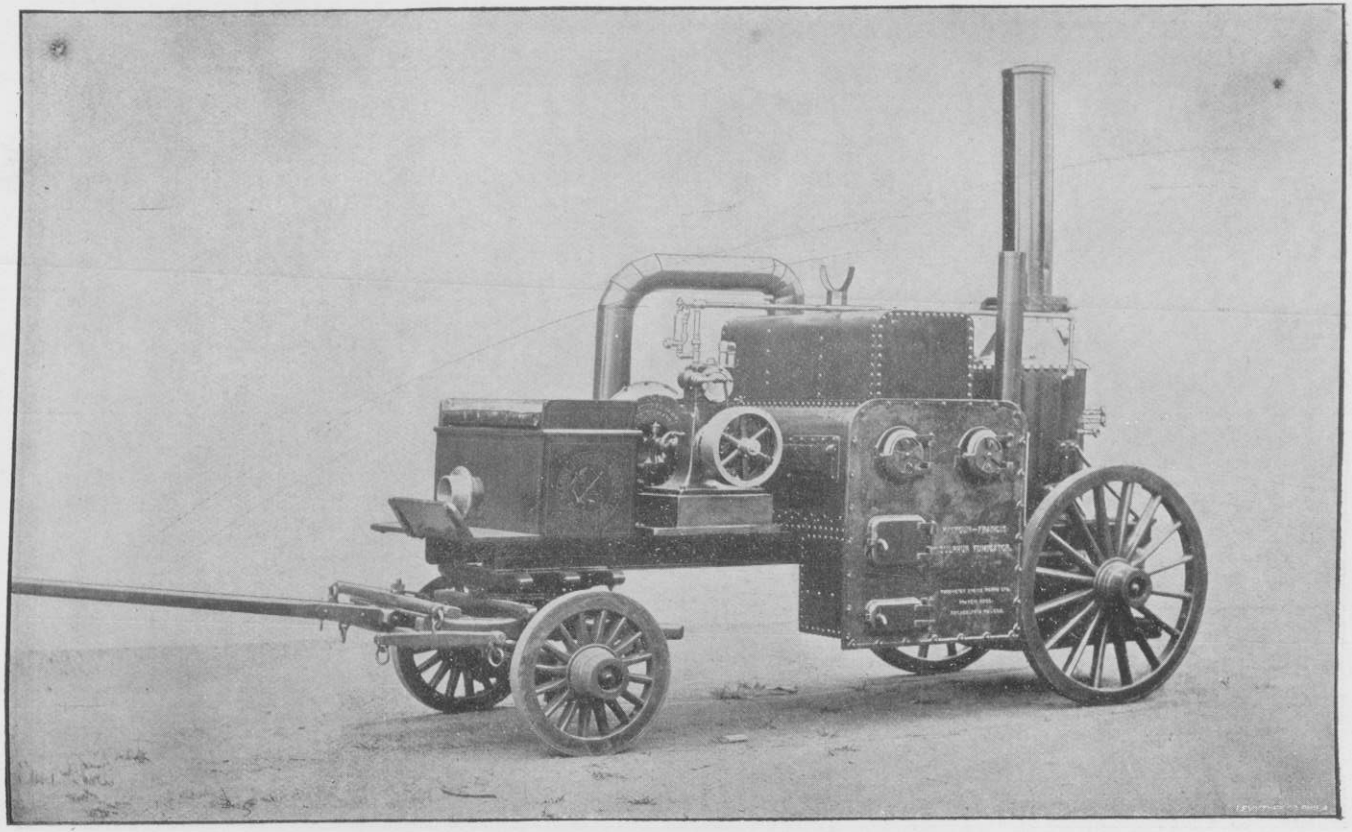
For fumigation by sulphur dioxide gas, whose action is exerted as sulphurous acid, we have a specially designed furnace, double, with fire-box at each end, over which are shallow cast-iron pans, the whole enclosed in sheet-iron frame.

To prevent too rapid combustion, baffle-plates are arranged, and the proper quantity of air is admitted through adjustable valves in front. The fumes generated in this furnace pass to a reservoir, from which they are sucked and forced into the apartment being fumigated, through suitable piping or hose.

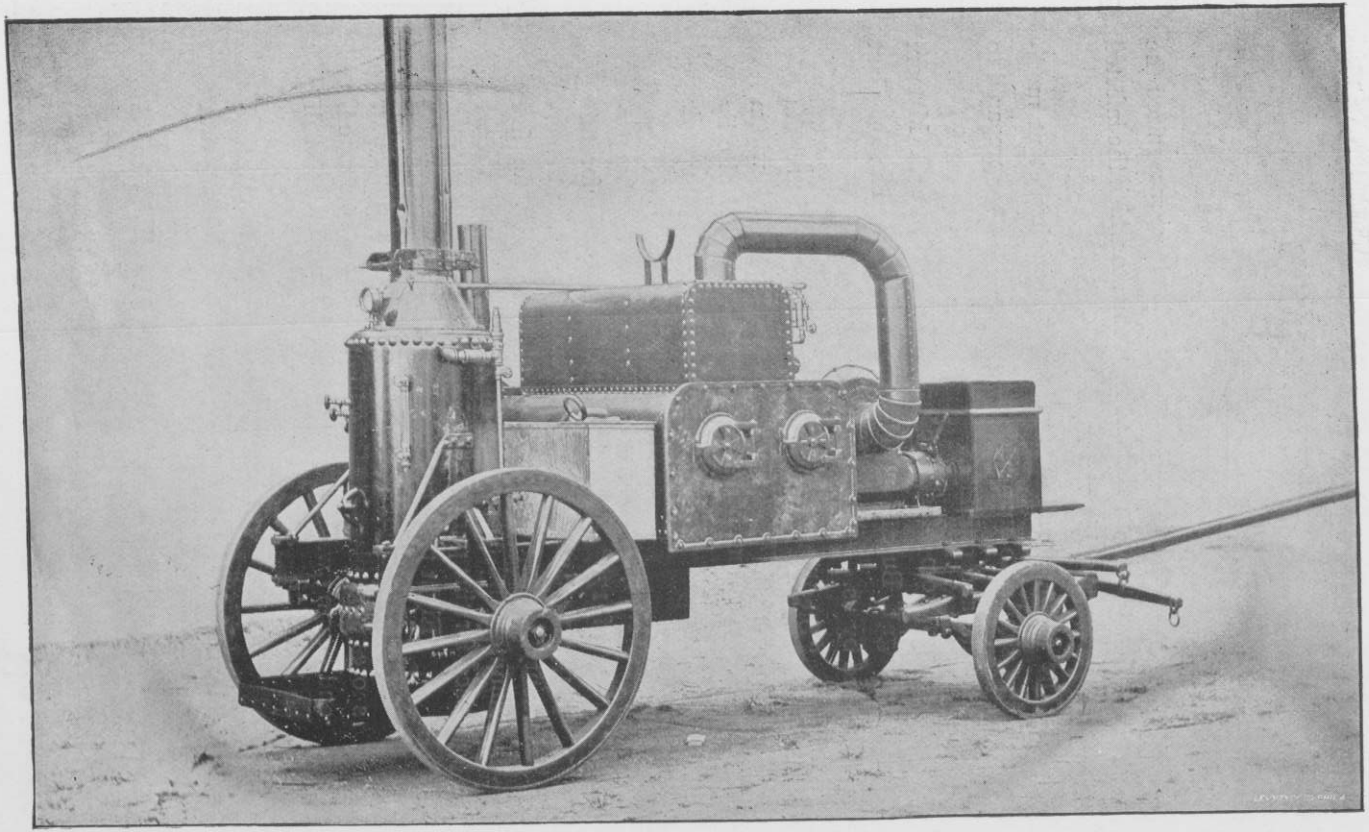
We have patterns for several sizes of single and double sulphur furnaces.



DOUBLE SULPHUR FURNACE



KINYOUN-FRANCIS PORTABLE SULPHUR FUMIGATOR—WORKING SIDE



KINYOUN-FRANCIS PORTABLE SULPHUR FUMIGATOR—REAR SIDE

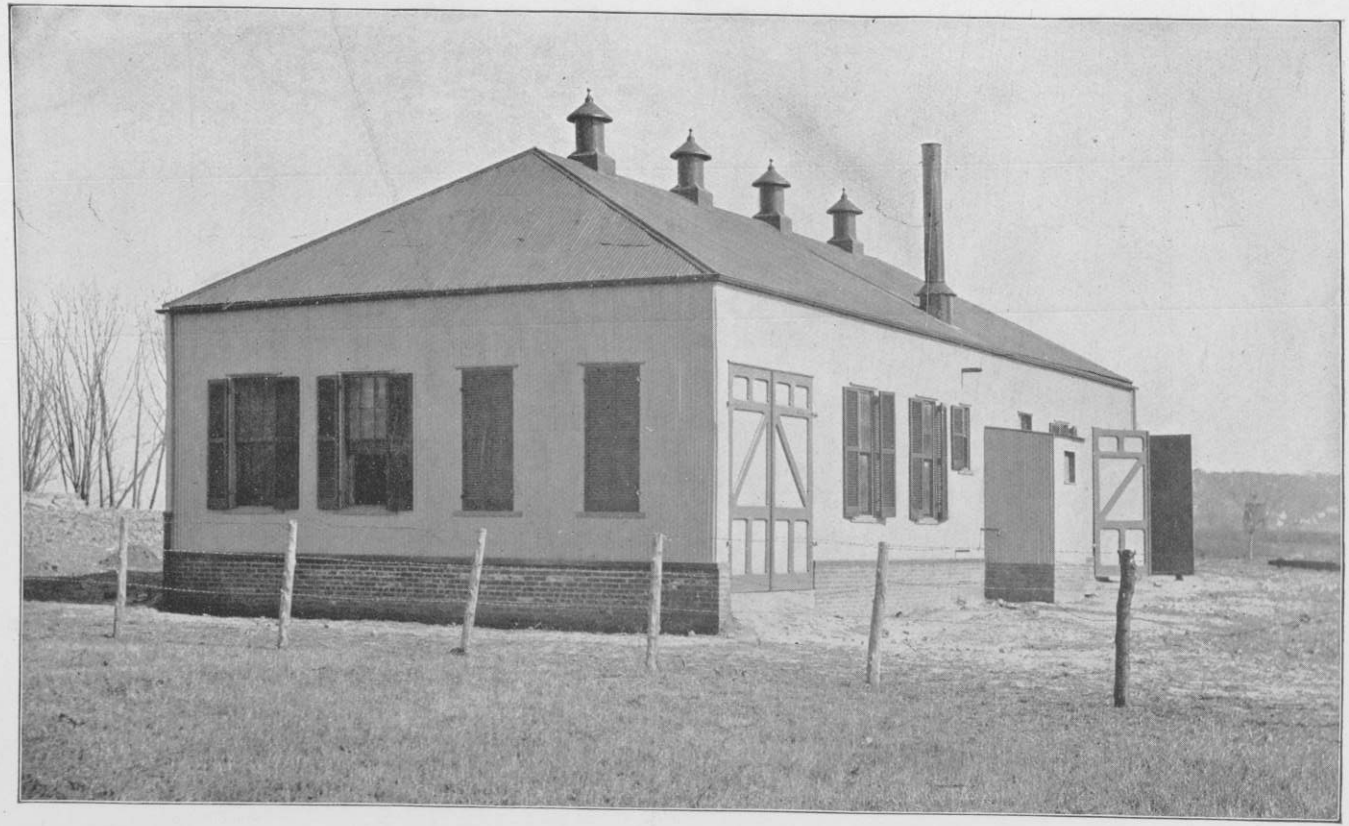
MUNICIPAL PLANTS

The Boards of Health in many cities have recognized the necessity for municipal disinfecting plants, to which the infected goods are conveyed in vans.

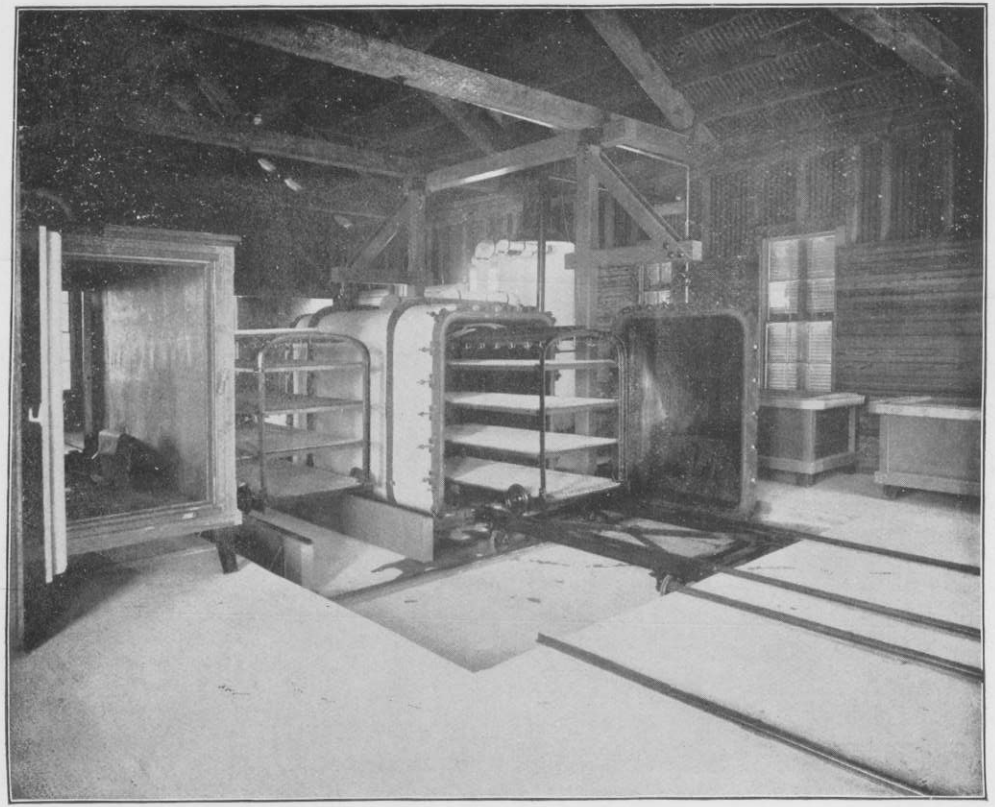
The arrangement of machinery is, with important modifications, similar to quarantine stations, and we are prepared to submit plans and estimates.

Extract from official report of Dr. Eugene G. Matson, Bacteriologist, Bureau of Health, Pittsburgh, Pa., on plant furnished by us.

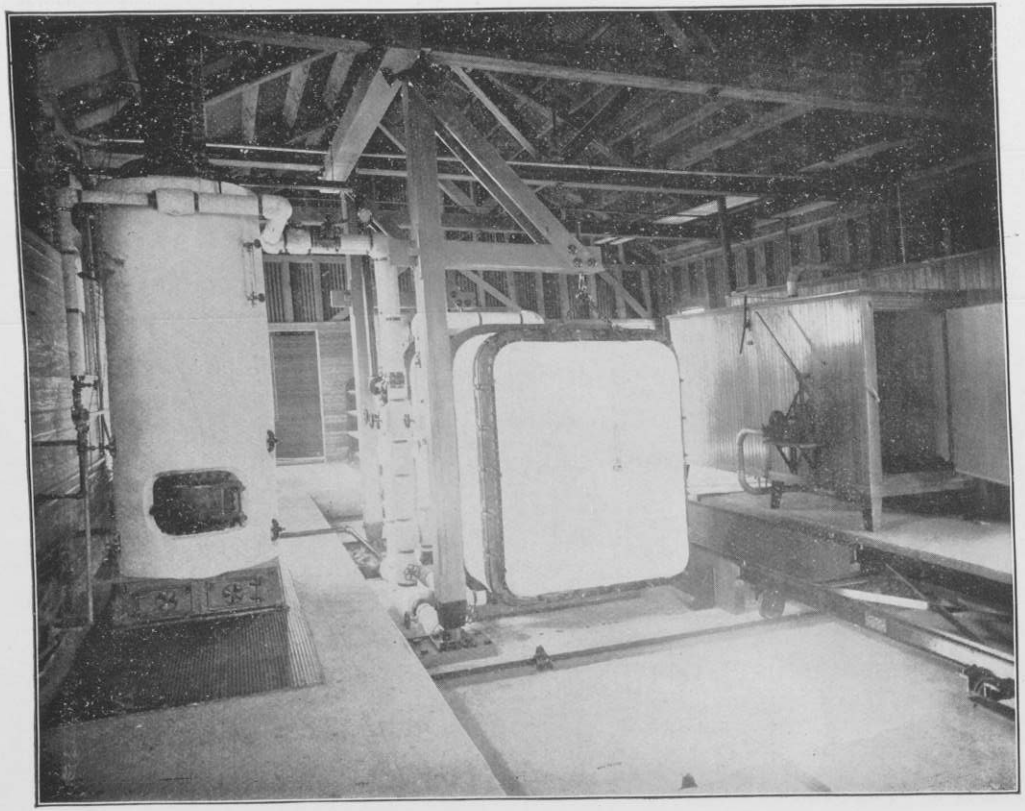
> "Sterilization was tested by actual results obtained upon infectious material, placed within woolen, cotton, hair and other articles, and also by ascertaining the penetration of heat into their interior.
>
> "Non-sporing germs are destroyed at a temperature of 170° Fahr. We used diphtheria for this purpose. Sporing germs are destroyed, with certainty, by exposure to heat of 220° Fahr. for five minutes, and as is customary, anthrax spores were used for this purpose.
>
> "Eight tests in all were made, in the first five of which materials infected with diphtheria and anthrax spores were placed in the various fabrics enumerated, and heating was carried on from five minutes to half an hour.
>
> "No growth could be obtained from these materials after removal from chamber, showing that disinfection was perfect.
>
> "A temperature of 236° to 238° Fahr. could be obtained and maintained for a period much longer than was necessary for sterilization."



MUNICIPAL DISINFECTING STATION, WASHINGTON, D. C.



INTERIOR OF MUNICIPAL DISINFECTING STATION, WASHINGTON, D. C.

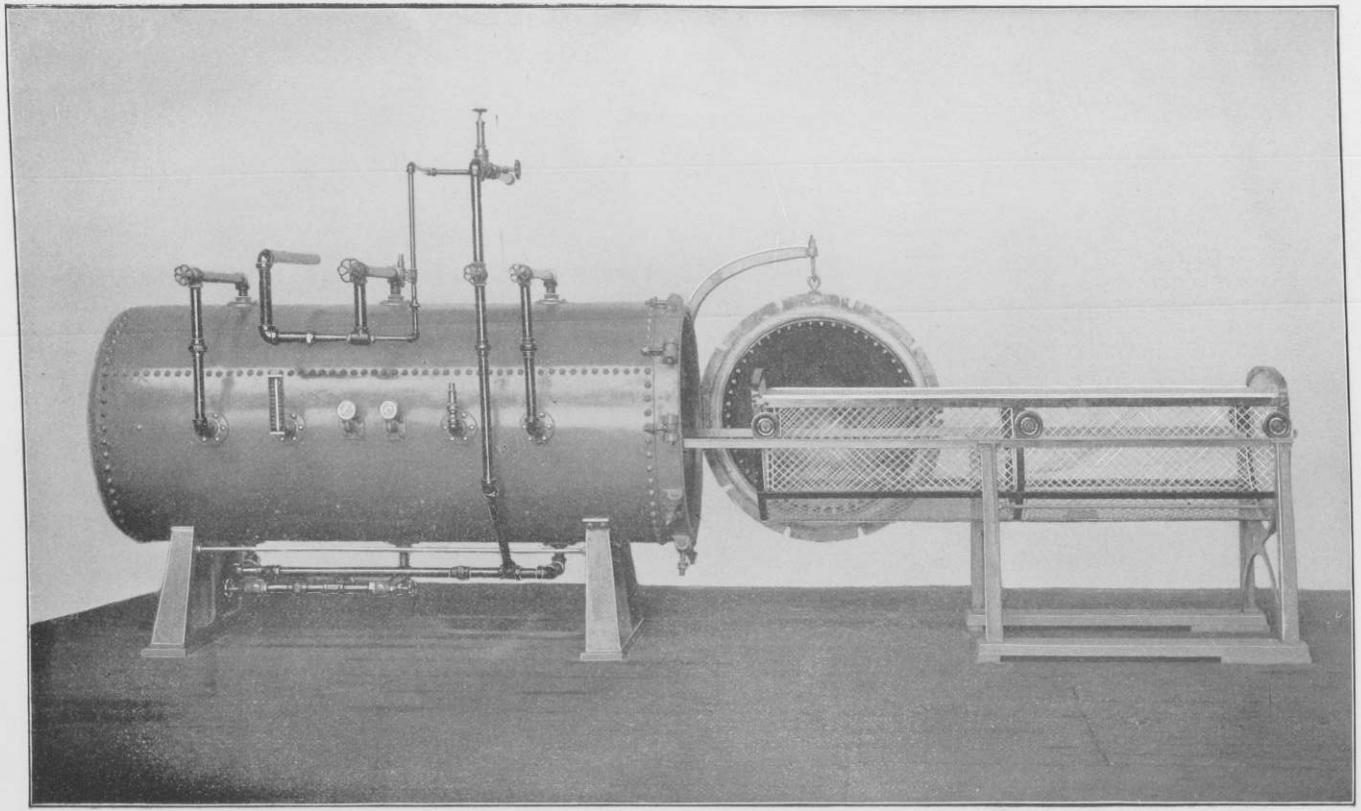


INTERIOR OF MUNICIPAL DISINFECTING STATION, WASHINGTON, D. C.

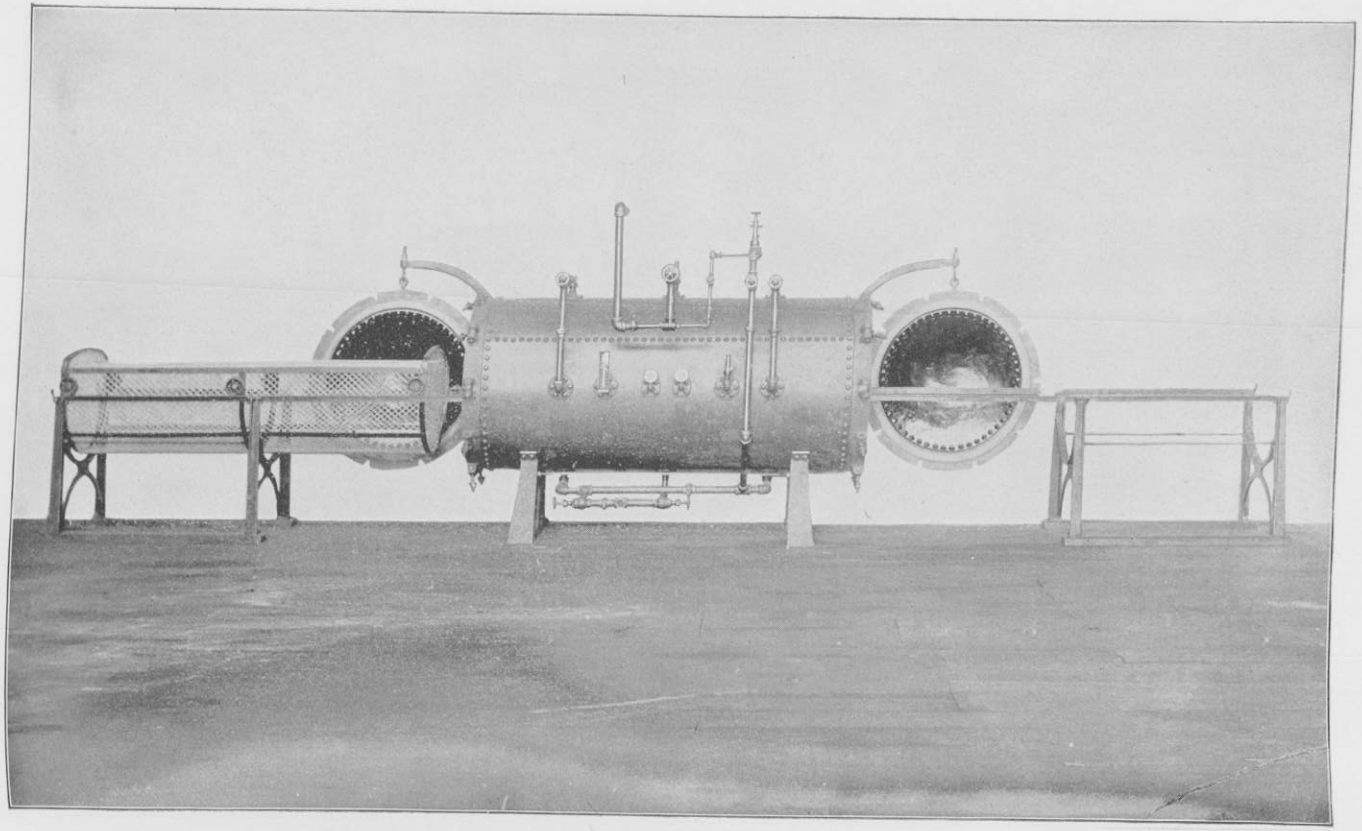
These chambers have an inner and outer steel shell, forming steam jacket, in which, during operation, the steam circulates; door at one or both ends, as desired; carried by davit cranes, supported by end frames of chamber; copper hood to prevent steam from carrying condensation directly upon goods exposed; car with removable tray to carry mattress, clothing, etc., and are provided with patent air exhauster to produce vacuum; thermometer to indicate temperature; gauges to indicate pressure and vacuum; pop valves for safety; reducing valve to regulate steam pressure to that desired, and all necessary steam, exhaust and drip piping.

The chambers with doors at each end are usually installed by having a partition dividing one end from the other, so that the goods sterilized, in removing them from chamber, are not brought into possible contact with infected goods.

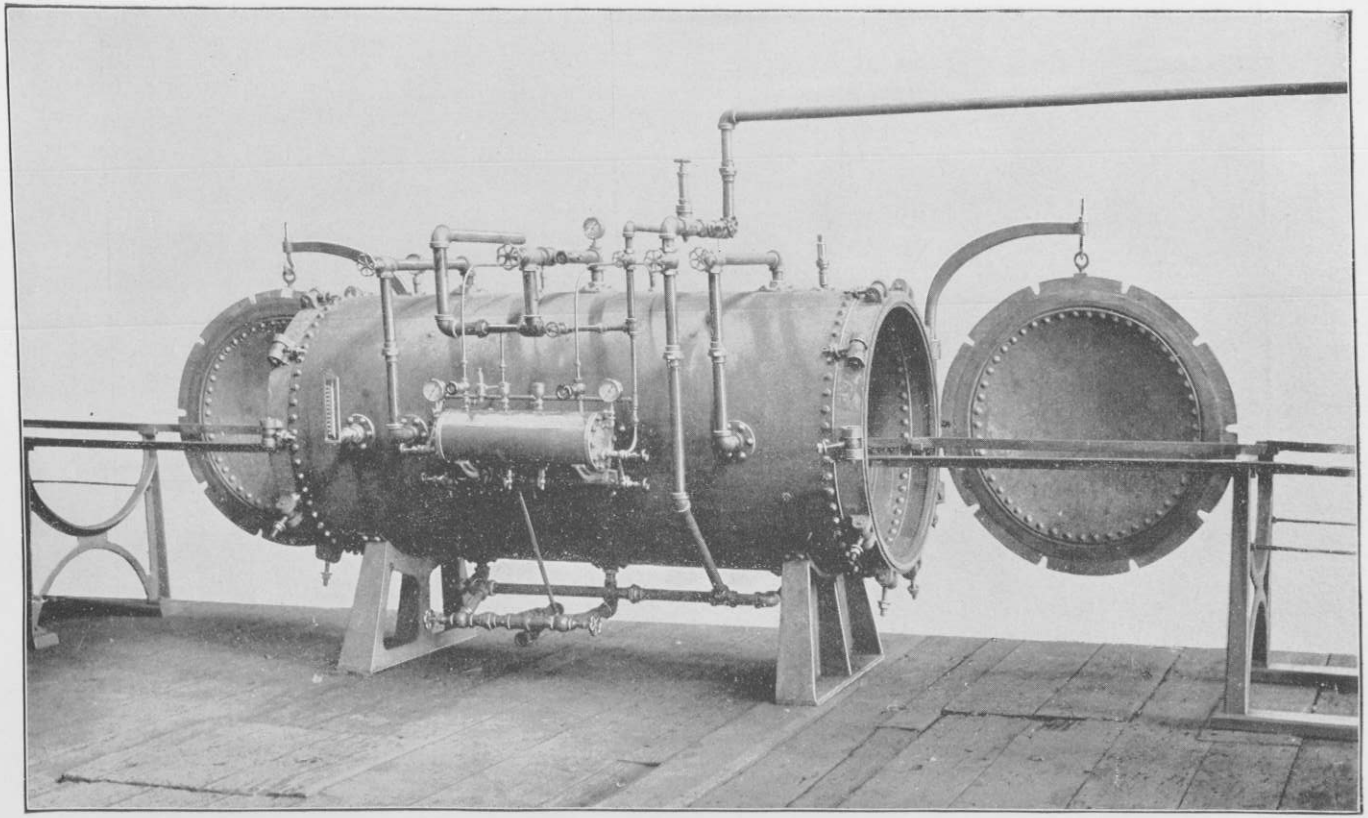
We make these chambers in several sizes, and also attach apparatus for generation of Formaldehyde gas, when desired.



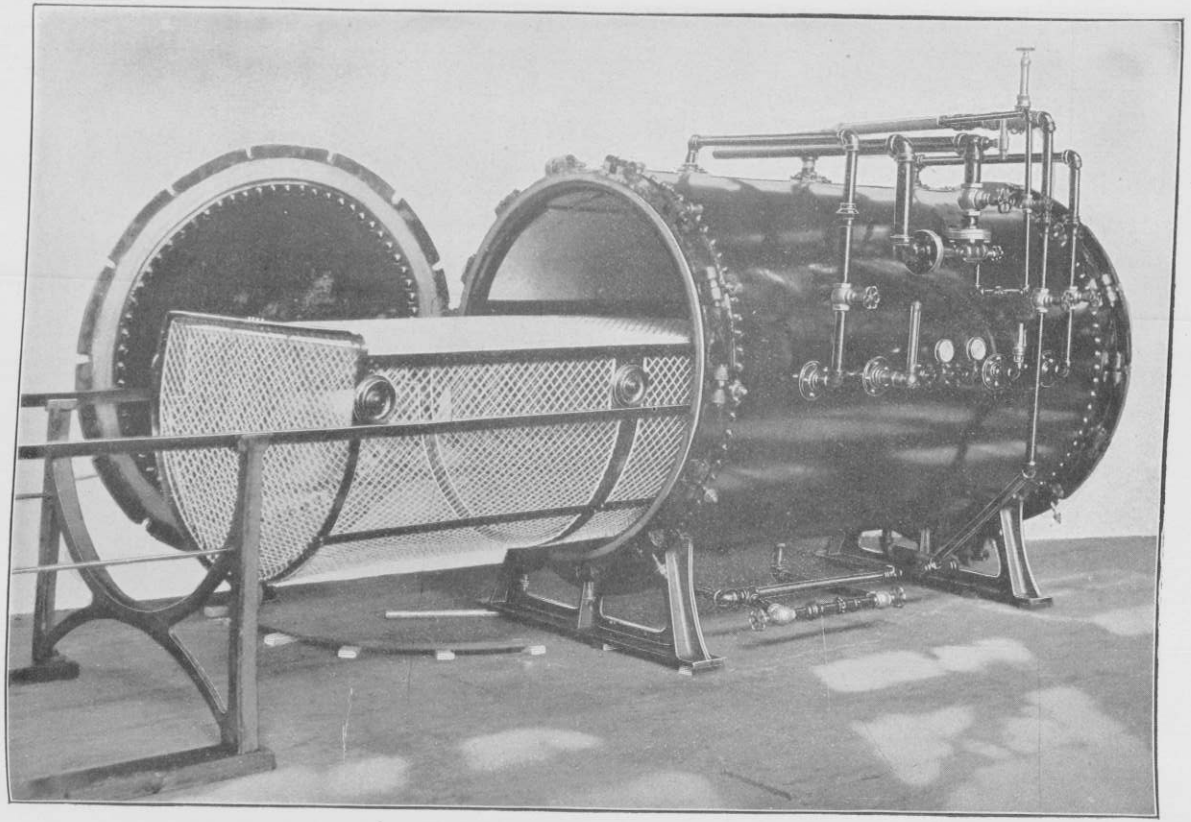
40″ CHAMBER WITH DOOR AT ONE END ONLY



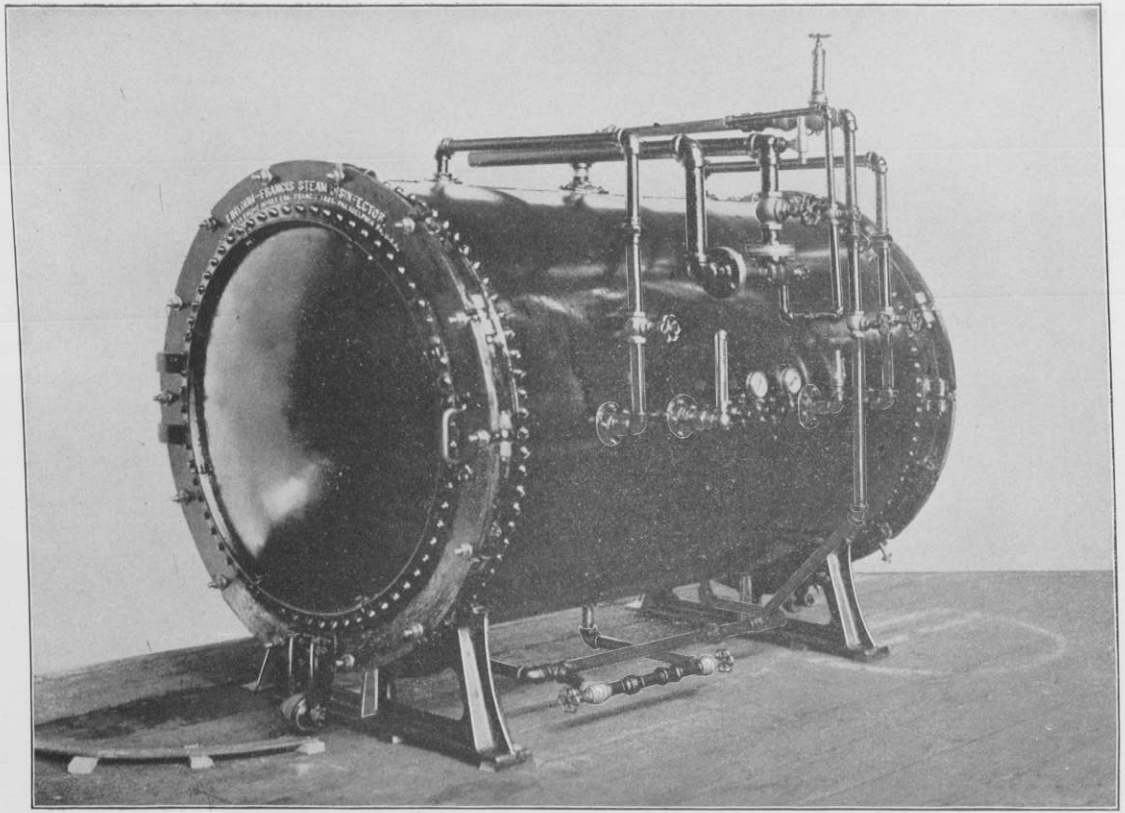
40″ CHAMBER WITH DOOR AT EACH END



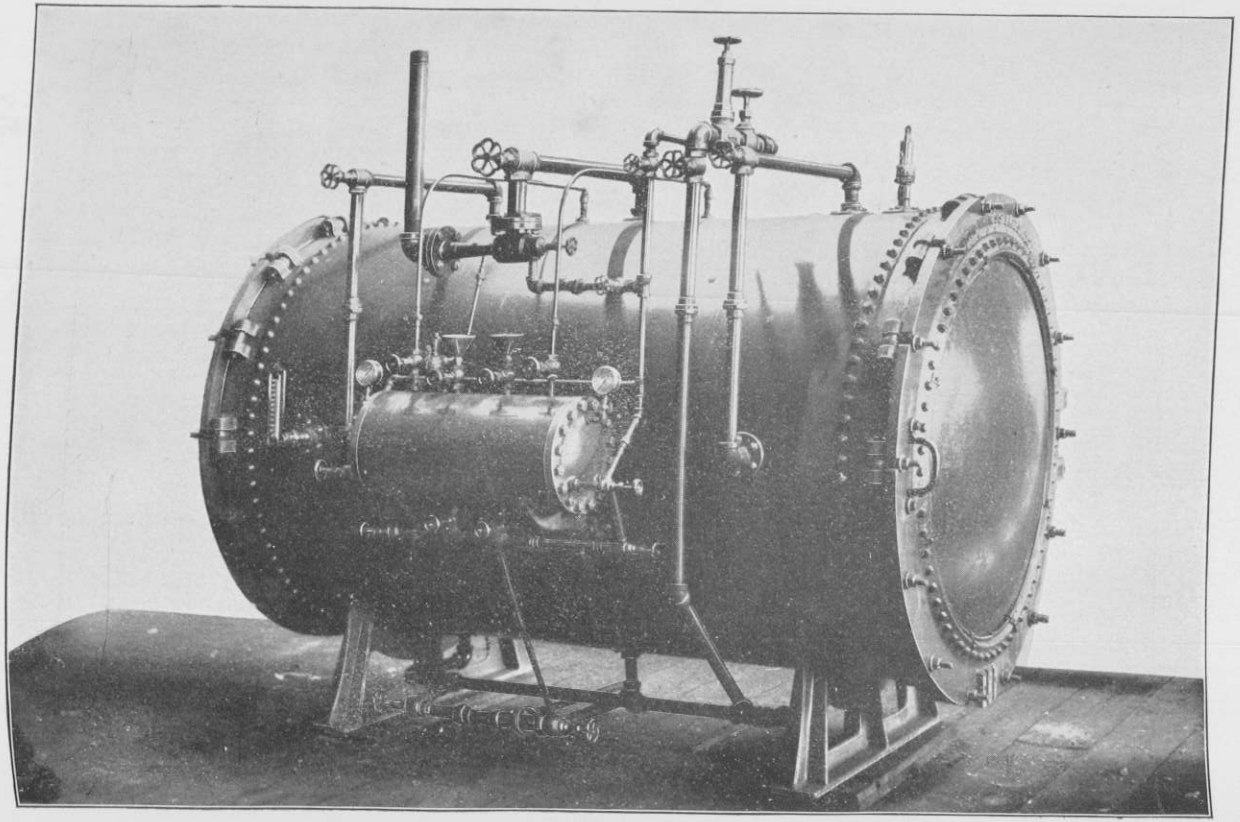
40″ CHAMBER WITH FORMALDEHYDE APPARATUS



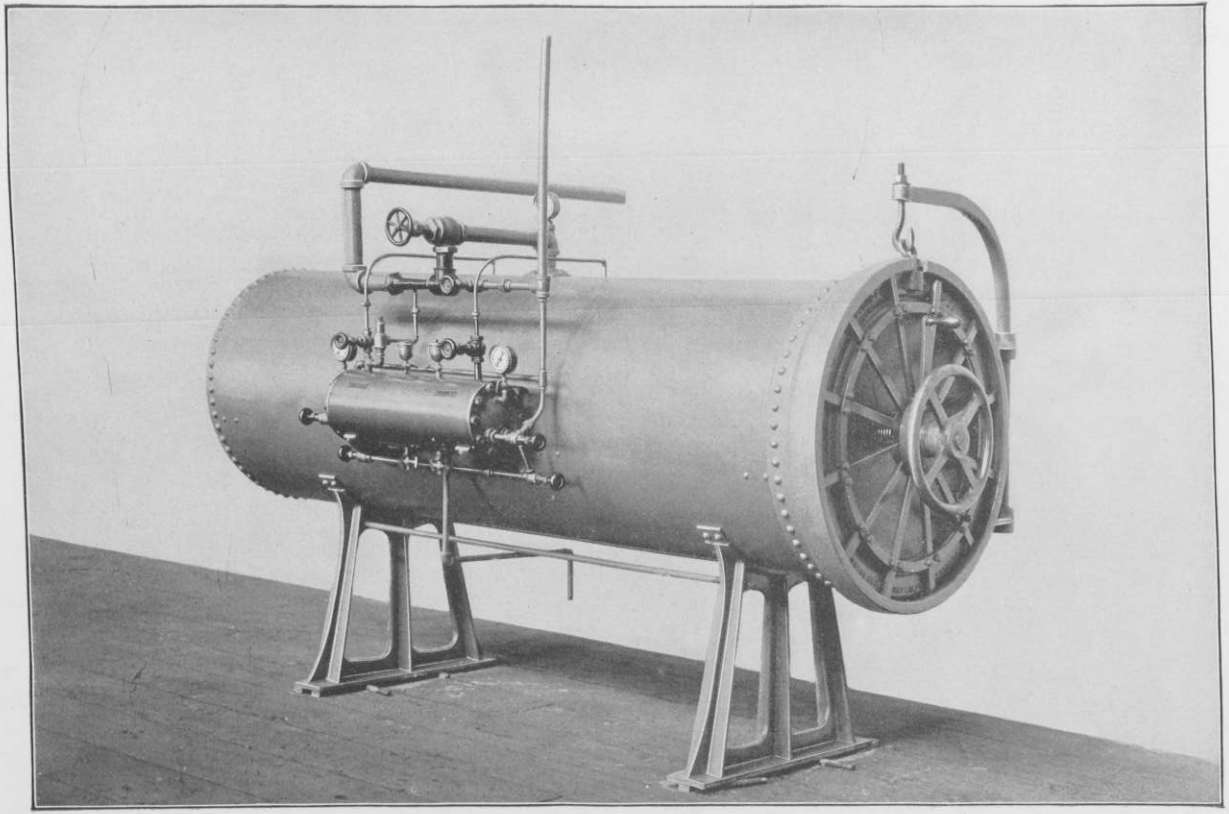
56″ CHAMBER—DOOR AT EACH END—OPEN



56″ CHAMBER—DOOR AT EACH END—CLOSED



56″ CHAMBER WITH FORMALDEHYDE APPARATUS



30″ FORMALDEHYDE CHAMBER

AUTOCLAVES

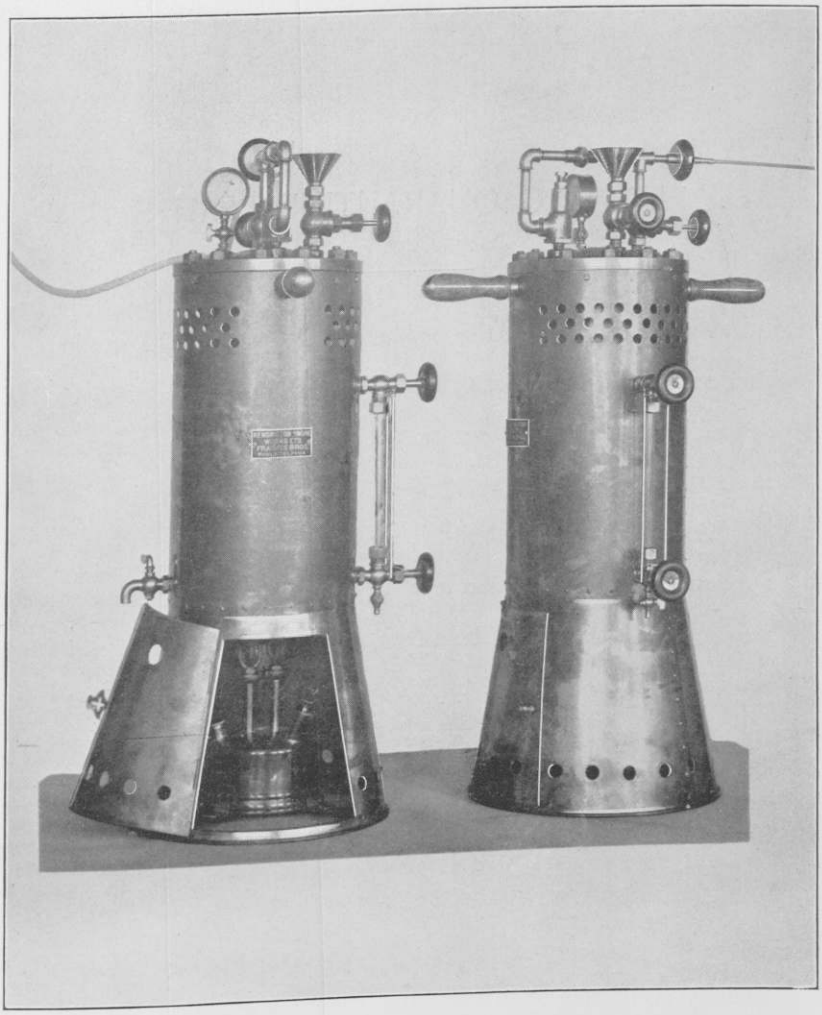
Formaldehyde gas, although of comparatively recent discovery, has won for itself a high place as an efficient disinfectant, free from the ruinous effects of bichloride of mercury, sulphur dioxide, etc., upon certain articles.

Dr. J. J. Kinyoun, Passed Assistant Surgeon, U. S. Marine Hospital Service, in *Public Health Report*, says :

> " Experiments were made by subjecting samples of wool, cotton, fur and leather goods to crucial tests, using solutions of various strength and also a saturated atmosphere of gas.
>
> " Of over 225 different samples of wool, silk, cotton, linen, leather and hair employed in the tests, there was no change observed in textile character, even when they were soaked in strong solution of gas, and little, if any, change occurred in the colors of fabrics."

For the disinfection of rooms in public institutions, hospitals and other places, we are making the apparatus illustrated.

It can be furnished in several sizes, as may be required, and is tested to 150 lbs. to square inch, having safety valve, stop valves, gauges, glass, etc., and a high grade lamp, heating quickly and safely, the enclosing casing preventing diversion of flames and carrying the heat entirely around the copper retort.



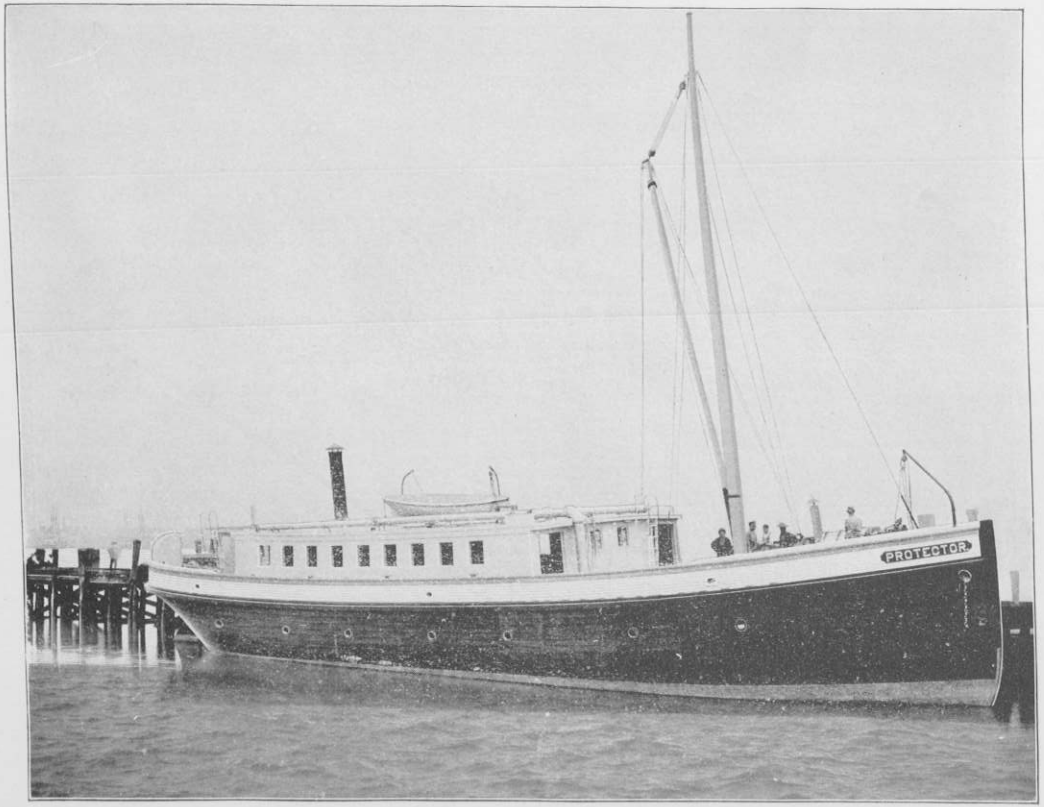
KINYOUN–FRANCIS AUTOCLAVE

FLOATING QUARANTINE PLANTS

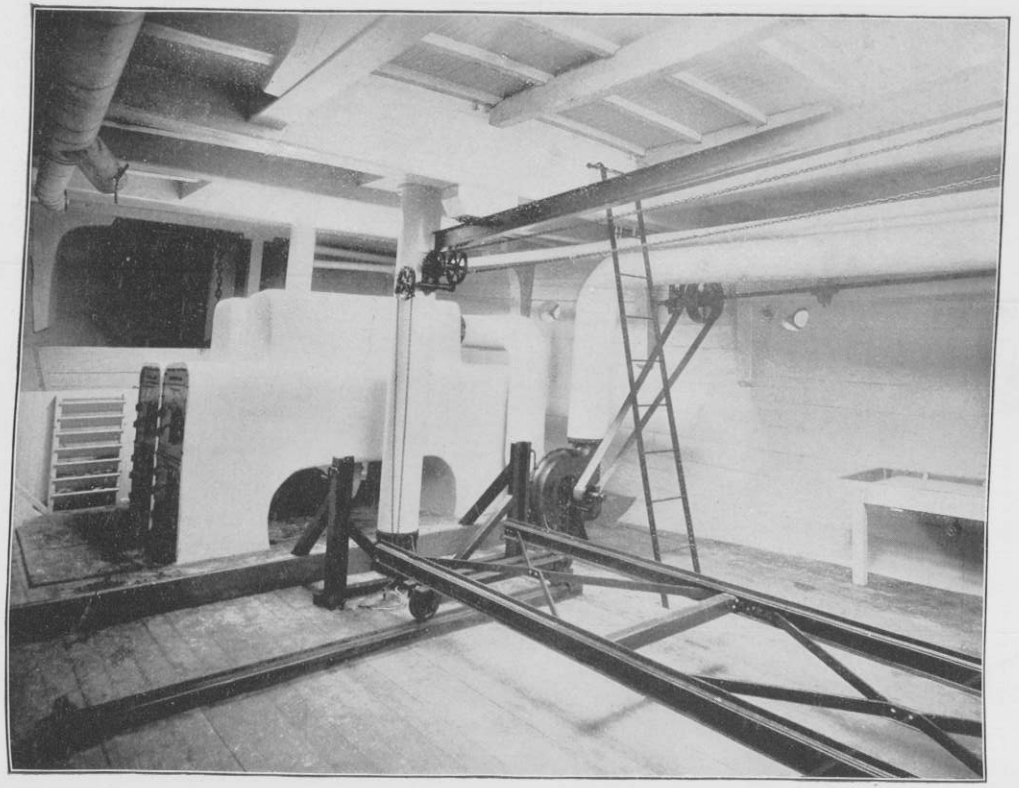
At many points the value of a Floating Quarantine Station has been underestimated. It has advantages not possessed by a fixed station, as the latter, in most cases, are necessarily in out-of-the-way or at exposed situations.

A vessel properly designed and equipped with all modern appliances for disinfection can be stationed in a convenient position in harbor, and be taken from vessel to vessel as its services may be required, and in event of a near-by port being threatened can be rapidly moved to the exposed point.

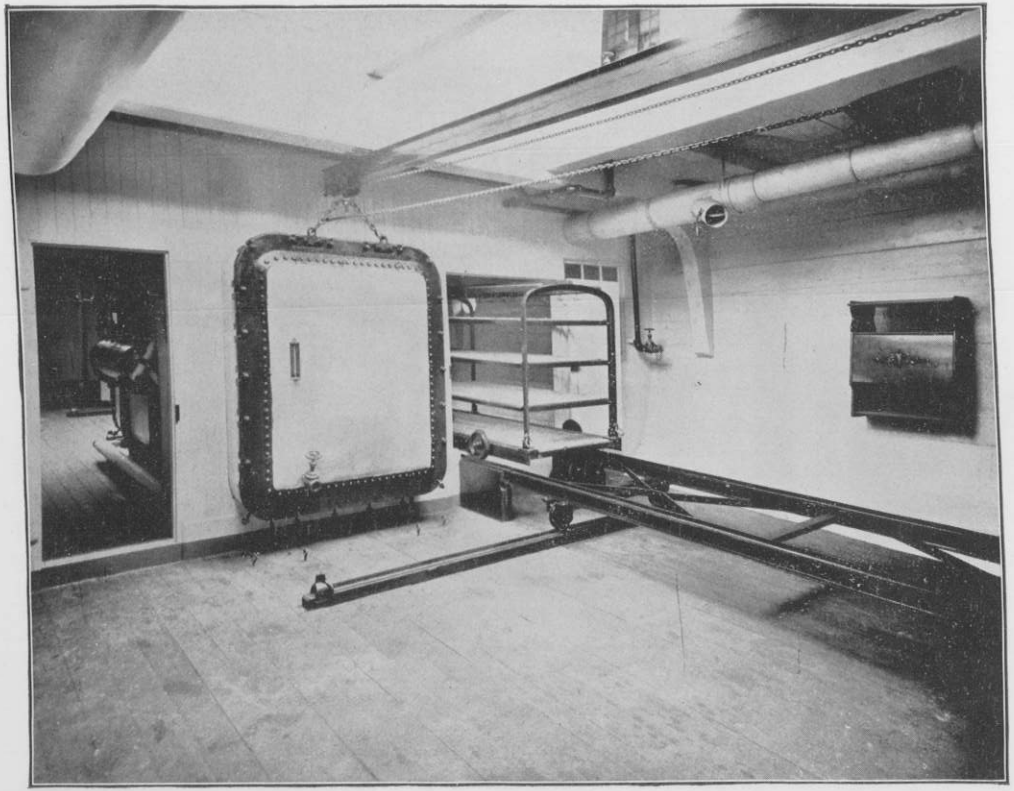
We are prepared to furnish such vessels for health patrol boats or as barges, without their own means of propulsion.



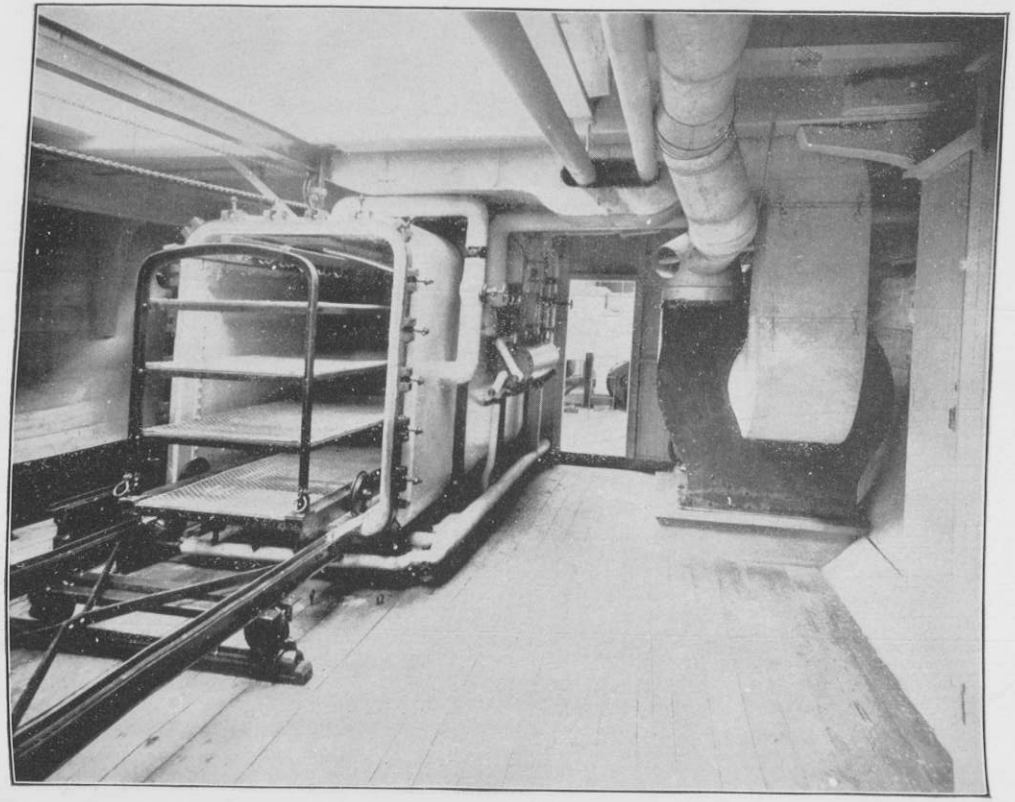
DISINFECTING BARGE "PROTECTOR"



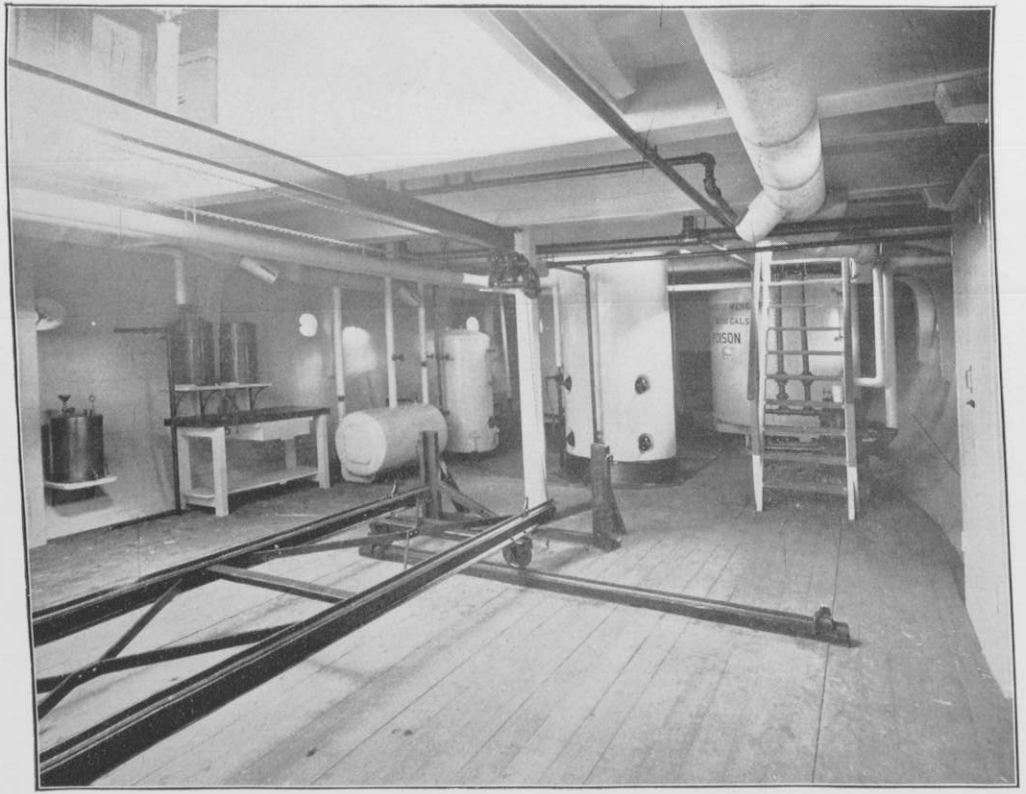
DISINFECTING BARGE "PROTECTOR"—VIEW IN HOLD



DISINFECTING BARGE "PROTECTOR"—VIEW IN HOLD



DISINFECTING BARGE "PROTECTOR"—VIEW IN HOLD



DISINFECTING BARGE "PROTECTOR"—VIEW IN HOLD

THE KINYOUN-FRANCIS DISINFECTING MACHINERY

IS IN USE AT

Delaware Breakwater Quarantine Station		
Reedy Island	"	"
Cape Charles	"	"
Southport	"	"
South Atlantic	"	"
Brunswick	"	"
Fernandina	"	"
Dry Tortugas	"	"
Key West	"	"
San Diego	"	"
Port Townsend	"	"
Washington, D. C., Municipal Plant		
Pittsburgh, Pa.,	"	"

Disinfecting Vessels Zamora, Jamestown, Koch and Protector.

Hospitals in various parts of the United States and abroad.

UNITED STATES ARMY

GEORGE M. STERNBERG
Surgeon-General

Have the Kinyoun-Francis Disinfecting Machinery in use on Hospital Ship "Relief."